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ABSTRACT

Taking an often humorous and anecdotal approach, this presentation offers observations about the implications of high technology for education and suggestions for educators interested in innovative applications of computers and other technological advances. Among the topics addressed are: (1) reasons for becoming competent with computers; (2) the appropriate time to purchase hardware and software given the rapidity of the advances in the field; (3) the use of the computer to leverage existing skills and amplify what the user is already good at; (4) the need for educators to be both conscious and competent with respect to the changing technologies that will inevitably affect education; (5) indicators and socioeconomic impacts of the information age and the new role of education in this era; (6) the need to design new ways of working and new modes of education in order to effectively use the new technologies; (7) the importance of developing different relationships between students and teachers, in that teachers will find it increasingly difficult to always remain ahead of their students in technological understanding; (8) the concept of technological breakthroughs that alter the world view of everyone regarding the former barrier forever; (9) the importance of taking responsibility for one's own purpose; and (10) ways educators can prepare themselves to have an impact on the future of education. (LAL)

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"High Technology: Its Implications for Community College Education"

by

Richard Byrne

Presented to the League for Innovation
Newport Beach, California

October 11, 1983

JC 840 189

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Introduction

Dr. Byrne is an educator in the most honored sense of the word. He originally came from Independence, Missouri. He has degrees from Kalamazoo, Missouri, and Iowa and a doctorate degree from the University of Iowa. He has published several articles and books, too numerous to mention here, except for his new book entitled, Breakthrough, which is soon to be published. He has to his credit more than eight multi-media productions in industry and education, including shows for the Smithsonian Institute and the Lyndon B. Johnson Memorial Library.

Dr. Byrne is the recipient of seven major teaching awards and is considered by many an outspoken voice in education in California, not to mention the rest of the country. He is one of the most sought after speakers in the United States; he delivers more than 100 major keynote addresses each year. "Managing the Impact of Computer Technology in Large Organizations," "Computer Phobia," "Education and the Communication Revolution" and "Strategic Planning" are just some of the topics. Personally, he has trained more than 1,000 top executives in the use and in applying the use of personal computers.

Aside from his demanding speaking schedule, Dr. Byrne is a professor and past Dean of the Annenburg School of Communications at the University of Southern California. Not only has he helped to create the prestigious environment that is the academic environment at the Annenburg School, he has also had an impact on the physical environment--he designed it. He has consulted on the design of many educational and corporate communications facilities, including the Atlantic Richfield Worldwide Video Conferencing System. Dr. Byrne is a founding partner of the Education Company, a new firm in Santa Monica. Very shortly they will be offering courses and seminars to chief executives on

leveraging and expanding their abilities with computers. I am pleased to have this opportunity to introduce Dr. Byrne and would appreciate your joining with me in welcoming him here today.

That was great, just the way I had you rehearse--a little long, a little heavy so early in the morning! I'm honored and delighted to be here this morning. I think you may be the last hope.

I've been involved in education for 25 years; I still teach 225 undergraduates; I taught them yesterday morning and will teach them tomorrow morning. I am a humanist, not a technologist. My whole background is in theater, music, poetry, painting, and the arts; and that is what I teach--the arts.

Sounded, if you listened to that, like I'm kind of an engineer-plumber, like I've got the plastic pocket protectors and lots of ballpoint pens. No, that's not true. I think the dichotomy between the humanities and technology is totally false. I have become technologically competent to empower myself as a humanist. I have found that if you are not technologically competent, you are disempowered. We are living in a technological age. I don't care what you say, that technology is accelerating. It is not accelerating with good effect; screwballs are at the wheel.

I became a photographer 15 years ago in self-defense, because I had a photographer. I had a full-time staff photographer who was supposed to dote on me and fulfill my every whim. I would say to him, "I would like this picture of Charlie Chaplin, and I would like this title in the upper right hand corner." And he would say, "Well, we can't do that." And I would say, "Why?" He would say, "Well, we need a strobinar reproflex 9.7 heliostat," or something. And I would say, "No, we have that; we spent $18,000 dollars last week. Don't we have that?" And he would say, "No--all we got was the frobinon...," and I didn't know what this guy was talking about.

While I had the nagging feeling that he could do it, I didn't know enough to know whether he could do it or not. I didn't know enough to even know what

to ask to find out if he was lying. Then one day I went into the darkroom unannounced. I just walked in; I wasn't trying to trick him; I was trying to find him. I went into the darkroom. This guy was mixing chemicals; he had dumped powdered chemicals in the trays. I don't know if you know, but in a darkroom you have trays of chemicals, and he was at the end of the sink with a hose. There was this big arc of water landing in the end tray (this is not an elaboration at all), and there was powder flying all around. He was mixing this by spraying water into these various trays.

I took one look at it and my intuition told me this guy was nuts, this cannot be how you do that. So I suddenly realized I had put my destiny and my ability to communicate as a humanist and my ability to teach as someone teaching in the arts, particularly teaching theater history, in the hands of somebody who was incompetent but looked competent.

And I thought now, okay, become a photographer. I did not become a photographer to beat him up; I just wanted to communicate to students. I wanted to educate them in the best way that I knew how. So I wrote to Eastman Kodak and said, "Please send me everything you have in print on still photography and send it C.O.D." Forty-eight hours later, a big box arrived. Most of it was free; it cost $48.00 total for everything Eastman Kodak had to sell 15 years ago on still photography. I bought a Nikkormat, a bulk loader and 100 feet of film.

I went into the darkroom the next day and was sitting there loading this bulk loader; I had the instructions. The photographer came in and saw me and his eyeballs got about this big around, because he knew the jig was up. I was actually going to learn what was going on in the darkroom. He said, "Let me do that for you." I said, "No, no I need to do it myself." Later he became a fabulous photographer for me and with me.

There was a paradigm shift. You know the concept, that you have this world view here you're trying to get out of the bank and you can't get the door open, and some six year old kid says, "It says pull." You back up and it says "pull" and you're so embarassed your ears burn and you won't go out the door. That's called a paradigm shift. The door didn't change; the technology didn't change; your intention didn't change; your mission didn't change; but the world changed!

This guy saw that I was going to learn whatever it took to do whatever I wanted. Almost immediately he would do anything I wanted, and he became creative. He became more imaginative than I was. So my breakthrough, my paradigm shift, shifted his as well. That's exactly why I learned about computers.

Four years ago I could not operate a computer; I had no experience of any kind on any computer. I had a consulting firm and I was working with executives and they would say, "Richard, I'm thinking about getting a computer for my-----son." You could smell that there was something--the circuits were wired wrong here or something. I would say, "Good." They would say, "What is a good computer to get for my-----son?" I would say, "I don't know." See, because I do tell the truth. I really am willing to be quite ignorant, particularly when someone asks me something I don't know. So I said, "Well, I will find out for you." They said "Okay." I started doing homework on personal computers, and I started to find out what they are, what do they do, how many, etc. And then I said, "Well, I'll go with one of the Apple II or Radio Shack. Remember this was four years ago; this was two life spans ago; four generations ago in personal computers.

So it was very easy; there were only about six models. I finally began to recommend the Apple II. And then the guy said to me, "Can you teach me, and my son, and our controller, and the chairman of the board?" I said, "Sure."

Now, I did not at that time know how to turn on a computer. I hope you're clear about the way this works--you don't become competent and then offer your services. You find out what is wanted and needed. You guarantee your service, and then you become competent. That is the way the world really works! That is why I say to you I think you may be the last hope, because you have in your title that you're interested in innovation. My experience is that higher education is not interested in innovation. Higher education is interested in doing whatever worked. That worked. Okay, let's do that!

And the world is changing. Four years ago when I got this idea to help executives and their sons, daughters or whomever learn to use computers, I went to the Annenberg School of Communications at USC. I want to say upfront that I admire and respect the school I helped found. I designed it and I'm not going to take a cheap shot at it just because I'm out of town. However, four years ago, I proposed to them that we buy some microcomputers so we could offer coursework for executives, because we are a professional school aimed at the MBA program in communications. I said we ought to get some microcomputers; we should then learn how to use them; we should then teach people how to use them. And you can guess the response. This was four years ago. What did they say?

They didn't say no. You don't usually get a no when you go to someone in higher education. Very few people say no. What they said is, "Which computer should we get?" I said, "I don't care; I can't use any of them. Let's get one and learn how to use it." They said, "We don't want to look like fools, let's get some good computers." So they formed a study group.

A task force started to study the computers. "Oh, this one has 16K, but this other one we understand will soon have 24K." Now let me ask you a question. This is the computer upon which I currently am writing my book. This is the

RS 100 made by Radio Shack, cost $795, weighs three pounds, runs on penlight batteries, and has 32K of storage. Will these computers get smaller? Yes. The size limitation right now is the size of our fingers. This is the computer that I used to use. I don't know if you know, but this computer is 1,000 times smaller than this computer. Hello--watch my lips! This computer is 1,000th the size of this computer, because this isn't a computer. It is a terminal. This links through phones to a mainframe computer which is huge. This, in fact, is a later generation. It is a complete computer; it has word processing stored in it; it has basic programs; and it has tele-communications and all that stuff.

Now, will these get smaller? Well, the limitation right now is the size of the keyboards. You can type much faster on a full-sized keyboard than on a size like this. So the limit right now is about the size of a sheet of paper, eight and one-half by eleven inches. It is a good size for most folks.

How long will it be before we can have voice entry, voice synthesis, voice recognition?

One problem you have is a lot of you are heat seekers. You know, heat seeking missles? Some of you are gear freaks. You just like stuff, new stuff. You like the fingertip computer; you wear it while you jog and it tells you when you died. There is good news and bad news in that. Many of you know the reason why you're in this meeting, instead of back home trying to get off work early. You are achievers. You are adoptors and innovators, and you are trying to do something new and different. So a lot of you see this and immediately say, "Gee, there are seven ways I could use that."

Now you know for every one of you there is an alter ego, another person who is at the other end of this curve. There is a large thing called the "innovation curve." Many of you know about that. Whenever there is a new idea, there is someone up here who does it that instant. You are all committed

to that; you are committed by the name of your group to be at the upper end of this curve. You are the type of people who fly in planes, read the inflight magazines, Office of the Future, Education in the Home, and believe them.

That's good news, except some of you are fickle. Another computer comes out that is a little neater, then you get it. Then another one comes out; you get it! You know that microcomputers are going to continue to change, and I just used that as a symbol. They are going to continue to change, get smaller, more powerful, and cheaper all the time. Right? So, shouldn't you wait? The key issue in this is how long should you wait, and what is the signal that now is the time? I mean wait until when? November?

Let's take a look at software. Look at what happened at the low end of computer software. By the way, I use microcomputers because I think they are the most important technology in the field today. That is why I talk about them. They are the on-ramp to the data freeways, to the information freeways. I can also talk about fiberoptics, lasers, biocomputers, etc. I'm not going to do that; I'm going to talk a lot about microcomputers; they are the easiest way to get into the information stream.

Take a look at what's happening at the low end of software. Three years ago Visi Calc appeared. You all know about Visi Calc--the spread sheet program? My assumption is you probably do. Two years ago Super Calc appeared, which is quantum leap beyond on Visi Calc. In December of 1982, nine months ago, Context MBA appeared. That is another quantum leap ahead of Super Calc. In May Lotus I, II and III appeared which is way beyond that. In June the LISA appeared from Apple which does it all with icons, and moving a mouse around on the tabletop. In August Vision appeared, which does all that stuff by simulation on an IBM micro, so you don't need a $13,000 LISA, which by the way is now down to $8,500. In five months it has come down $5,000. Now the next

one is called the Gavilan. The Gavilan is about this size, or a little bit larger. It has a fold-up screen and it has a little touch key pad, so you can do all the stuff you do with the mouse, except with your finger on the keyboard. And it has visual icons. You can stack up the work on the screen, just like you can on the LISA. Now there have been five generational shifts in the low end of software in the last eight months.

So when should you get in? I mean, shouldn't you really wait? Now, let me tell you my answer. My answer is you get in any time you like. Like leaving this building. It has a revolving door; you get in any time you like.

Use it for something that will increase your productivity, or increase the productivity of the students who are working with you. Let me tell you how to do that. You must leverage your own skills; you must not use a computer to do what it does well; you must force the computer to do what you do well.

What do you do well? You know anything you do well? This may be your problem. Give me one thing you do well. I'm not interested in what we do well; I'm talking about you. You disseminate information. Do you do that by speech, or by written memos? Which are you better at? Speech? Okay--then one thing you might want to do is find out about a microcomputer or mainline computer base software package that will help you disseminate information by mouth better, such as a voice store and forward system. Then find the cheapest piece of hardware that will run that system. And if you use that for 60 to 120 days, you will increase your productivity at oral communication enough to pay for almost any computer on the market. You literally will cost justify any system, I don't care how much you pay for it, if you use it to do what you're already good at.

Most people don't do that. They buy a computer; then they spend about six months reading the manuals; then they learn programming. Forget it!

Because there are about eight people in here maybe who want to learn about programming. The rest of you ought to be using it for applications. So, what you want to do is leverage your own ability, cost justify, keep accurate records, and at the end of one year, give it to a church. I realize you don't have the same types of aids that businesses do, but move it down; give it to a class that didn't have it, and you will find that you have paid for it in admissions, tuition, grants, or whatever.

But if you try to use an integrated software system and do word processing, now spread sheets, now electronic mail, now a little programming, you will find that you will be in a productivity hype that will continue as long as you use the computer. You should not use it for all purposes; you should only use it for something at which you are already good. Computer technology, any high technology, amplifies whatever you are. It makes you more of whatever you are. It's like an amplifier on the stereo system.

How many of you are disorganized? Don't get a computer. Don't use a computer, and don't teach computers at your schools. For if you're disorganized, you will become disorganized at computer speed. You will have no idea how disorganized you will become and how fast.

For instance, how difficult is it to make eight copies of your paper files and store them in completely different places with different names? How difficult is that? That's a piece of work. If you took a file drawer and you xeroxed eight copies of it and labeled them all, that would take a week and you would know you were doing it. But, you could take eight copies of a diskette and go boom, boom, boom. You could store it here and call it that. You usually don't date it; you don't label it. And later on, you're sick at home one day, and someone comes in to try to find your grades. Oh, my God! What is this? Frog legs? Bird do!

People use passwords that are highly idiosyncratic. They hope they choose something that no one else could ever identify--so they choose something even they cannot remember. It may seem that I'm trying to be funny. I'm not! I'm trying to forewarn you, that it will amplify whatever it is you do. So if you want to become empowered as a communicator, first of all start writing very precise, articulate, clean, simple, short memos on 3 x 5 cards. Do that for two weeks, and then transfer that skill over to the computer. If you just use the computer to do what you already do, you will find that you will be less effective, not more effective, and it will really hinder the work you already do.

Now, if you don't believe all this, and you're going to change your style and get into technologies, you should get into waiting. I mean if you're not going to get in and cost justify and get rid of it, get into the next generation; get into waiting! Commit yourself to waiting as a lifestyle. I mean get into waiting, kind of in the metaphysical sense--waiting for the dough, waiting for technology to calm down.

A lot of people say it's going to simmer down. You see articles now in the Wall Street Journal about how the home computer boom is over. It wasn't really real. The assumption is there is a flux in the market. Some people say in two years there will be an Apple in every garage. People get it; they don't know how to use it; and in two years it will all be in the garage. Baloney! Put it in the garage and it will be gone in two hours. It you think that now that I'm empowered to use word processing, and electronic mail and digitized structure filing to help with my writing and to organize my speeches--if you think that I'm going back to scissors and scotch tape and a typewriter--you're nuts. I am truly empowered. If I find that all the computers in the world are destroyed, I will go build one, because I know the value of the tool.

My father is a cabinetmaker. Do you think that if somebody stole his saws and his chisels, he would just say, "Oh, boy, go back and get an axe and a log or something." No, he will create whatever it is he wants. So the revolution is already here; it is already happening.

I'd like to ask four questions that I think are the overriding questions for community colleges, particularly for people who want to innovate. Then I will give you my version of the answers. I think you will have answers of your own, and then we will talk about it at the end of the session. I'd like to give you the four questions.

The first one is, is anything changing? Is anything changing regarding microcomputers, mainframe computers, local area networks, fiberoptics, wave guides, mammography, satellite, direct broadcast satellite, point-to-point satellite, multi-point distribution systems, teleconferencing, videoconferencing, video disks, video cassettes, solid state audio disks, bubble memory storage, biocomputation, biocybernetics? I could go on. Regarding any of those things, is anything changing? How many think <u>something</u> is changing? Good. Hands down. I think that is a key question. Either it is or it isn't. You need to know. How many of you <u>know</u> something is changing? Let me see your hands. Hands down. That's a big difference. Some people <u>think</u> something is changing; some people <u>know</u> something is changing. You ought to recognize that is not just quantitative; that is a qualitative difference. You might think the temperature is going up in here. I think it's getting warmer in here. But are you getting colder? How can you tell which system is changing, the room or you? Now, suppose the sprinklers were set off by accident. All of a sudden we're all soaking wet. Some of you then would say, "I know something is going on here." See the difference between know and think? Some people say, "I think computers

are going to have an impact on education." You say, "Well, I don't." They say, "Well you may be right." That is not know.

Let me tell you the greatest danger that I see for higher education. I am convinced that things are changing. I am convinced that I am helping change them. I am also convinced that higher education does not believe it. Higher education thinks this is a fad; that it is cyclical; it is a moment in time; some people are surfing on the third wave enjoying the ride, but in time it will pass and things will return to normal.

There are three kinds of unconsciousness that encourage educators not to notice reality. I'd like to document the three kinds of unconsciousness right now. The first one is, most people are pretty good at what they already do, so they don't want to hear about this. People are competent at what they do, so they don't want to hear about it. You notice now that most teachers are not here today, or most administrators. I mean, this is a small group. I understand that you're members of the group, but suppose we threw this open for everybody in Southern California--every educator in Southern California knew about this meeting. Would we need the convention center? How many extra tens of thousands of people would flock in to hear this if it were open to the public? Well, maybe not that many. You see, a lot of people, if they have the day off, go watch reruns of the Dukes of Hazard. They go entertain themselves; they go play tennis; or they do whatever they do. But they are not engaged in a life struggle with the educational process the way I think some of you are. So, the first kind of unconsciousness is, people don't think it's significant; they just don't care.

The second kind of unconsciousness is based on dread. How many of you are a little nervous about things like this? One guy in the corner. Two people. Let me ask again, how many of you are a little nervous?

My experience is the world breaks into three classes of people--people who are younger than 42, people who are older than 56, and people who are between 42 and 56. I could be wrong. Maybe that isn't the way it breaks up. As a trainer in industry, my experience is those breakpoints are real. I'm not talking 41, I'm talking 42! People who are under 42 have pitched it in. They say, "Alright, whatever it is I'll learn how to do it." They're not excited, they don't want to do it; but they know there is no way to get out of it. So, they're going to have smart cards; they're going to have embedded chips; they're going to have automatic teller systems; and they're going to carry electronic mails. People who are over 56 say, "Forget it; I'll retire; I'll die."

I was in a major corporation in Chicago, and a guy said to me, "Richard, I think you'll be quite impressed with our electronic system. We have just installed the IBM prof system." And I said, "Oh, that's a great system." Brent said, "Yes, every executive is in intimate, person-to-person communication with every other executive, with instantaneous communication all the time." I said, "That is just fabulous, show me how it works." And he said, "Fine, Brenda, get my mail." There are a lot of academic administrators and they say, "Yes, we have this fine system, but I don't do no windows." In fact the resistence is that I don't type--not I can't type. See that would make you look like a fool. You know a guy is 48 years old or 54 years old, a Superintendent of Schools in Oklahoma City or something and he says, "I can't type; I'd really like to; take me about 20 minutes." You don't have to type! See the whole point is, only send messages like three words long, like "buy----the----state," or whatever it is. Then you don't have to worry about typing.

I think it was Abraham Lincoln who said, "Madam, if I had more time I would have written a shorter letter." You should think more and write less. We're not talking about turning out production typists; we're talking about production

thinkest! Thinking is the key--not typing. But they don't say, "I can't type." And they won't say, "I won't type," which would make them look as petulant as they are, or as you are. They say, "I don't type," meaning there is an esteem attached and that is really going to be a downer for me. That's being inverted right now. People now recognize that when you can use a compact or KayPro 10 that it is esteem bearing. You now have more esteem at being able to do it than you did back then when you would sneak in to type on the typewriter before the secretary showed up. That's going to change. Many people over 56 are opting out, which is fine.

People from 42 to 56 have a different dilemma. They are not young enough to actually acknowledge that there is no escape, and they are not old enough to get out of it. Sometimes these little things are like a pack of hounds after a fox. Wow! Micros! What are we going to do? Oh, no! I don't want to look like a fool. Maybe we should wait. Wait a minute. And retirement is way out at the front door. We're not going to make it until retirement. So, people from 42 and 56 are getting into strategic planning. And a strategic plan will take two years. "We know how to do that, and by then I'll be 46; maybe by then I will have figured something out."

In California it's different. People in busines, not education, between 42 and 56 are getting into wine. It is literally true. You read Venture Magazine or Inc Magazine and look at the new ventures column and see what percentage of them are men or women between 42 and 56 who have been high-ranked vice presidents of long-range planning or something for high technology firms. You backtrack and you will find that in the last 12 months that there has been a decision to go on-line. An on-line interactive communication terminal on every desk. Xerox says that within three years, there will be 1.1 intelligent terminal devices for every telephone in the American business. The Bell system thinks

there will be two by 1986--two of these devices for every telephone in business in three years. Now, will that have any impact on the educational needs? On who we're training? Either it will or it won't, depends on you.

I was addressing a data processing convention and I had the head of the largest IBM system in the world sitting right in the front row. I said to him, "Do you see any way that this might have impact on your business running mainframes?" And he said, "I don't see how." He didn't see how this thing will have any impact on their business.

You know what happens with these? People go out and buy--some of your teachers have these already--with money they don't have. Right? They learn how to use it on Sunday, then they come into your data processing division at the Superintendent of Schools on a fact system or something and they say, "Hook me up." They want to be linked to the network and start communicating with the real data instead of talking to the superintendents who then refer them to whomever.

So it's going to have an effect whether you want it to or not. Kidding yourself that these are not going to have any effect on education whether you do anything or not is like two cows walking through a Brazilian river, and one says, "Don't worry; the fish are only about this long."

How many of you are between the ages 42 and 56? Their kind of unconsciousness and this is the one I fear the most--is competence. Competence breeds unconsciousness. The more competent you are, the more difficult it is for you to stay conscious the entire day. How many of you have driven the freeways of LA or any other city? Do you ever notice that those people are competent? They're competent drivers; they really are. If you get someone who just learned to drive yesterday you can spot them on the on-ramp. They say, "Oh, this is an on-ramp." And they are backing off, "Excuse me, please." They back down

the on-ramp, because they're not going to get on the freeway. So people on the freeway are competent, but they're also unconscious. They're driving 70 miles per hour one car length behind the guy in front of them while checking their make-up. The girl is getting the mascara out of her eyes driving 72 miles per hour one car length behind the car in front of her, because they're competent.

How many of you can remember when your job was exciting? Now, some of you take that as an insult. You say, "My job is always exciting." Well you couldn't prove it by me--I'm looking at you. How exciting is it? It's exciting when you don't know how to do it. It's exciting like the first day. You walk in and you think I don't know how to do this. God, I hope they don't find out I don't know how to do this. If they knew how little I knew they wouldn't have given me the job. No, they knew how little you knew. Nobody knows anything. Everybody knows that. As soon as you're really competent at it, don't they start looking at you for promotion. "Hey, you know how to do that. Let's get you up here where you are incompetent again." The Peter Principle. And that's a good idea, as long as you're in the promotion ladder, where every time you demonstrate competence, they scare you again. You have been on a fast track, you get promoted three times and were given new projects three times in a row, three years in a row and you spent the whole time running around saying, "Oh, my God, I've got to get my car washed sometime this year." You don't have time for that because you're unconscious.

How many of you have driven to work, turned the keys off and found out you were at work? "Oh, my God, I'm at work! Gee, I hope I didn't kill anybody." You have no cognition at all of driving to work. That's called unconsciousness.

How many of you are competent? Well, big problem. Let me tell you the four levels of competence, and obviously I'm talking about more than technology. Technology is just the shield that I use to get people into the tent to talk

about aliveness, competence, responsibility, and making education work. You do not need technology to make education work; but it helps. If you are doing something you are incompetent at, you are conscious again.

I think the greatest virture of learning to use the computer is that it makes you conscious about what color socks you wear. For years you didn't know what color of socks you wore. So I'm preaching a gospel of consciousness. The first level of consciousness is called the unconscious incompetent; that is a person who doesn't know how to do something but doesn't know that something exists. He/she doesn't know that there is something he/she doesn't know how to do. It's like building sailplanes. If you've never seen a sailplane, you don't know how bad you are at it.

The next level is called conscious incompetent. This is one of the most painful levels. You know it's there; you may have even had this nagging belief that you should know about it; and you don't know about it; and you know you don't know about it. Some of you are that way with computers or videoconferencing or on close-circuit television. I understand that some of you even have studios, your systems have a studio, but it's not really being used much and you know about it and there is this kicking kind of dissatisfaction,

The third level is conscious competent. You learn how to do it and you become competent and you know you're competent. That is a point of tremendous satisfaction--"I know how to do this"--followed the next morning by being an unconscious competent. You now know how to do it, but it's no big deal because now you know how to do it. If you know how to do it, it can't be that big a deal.

So a lot of people flip from being highly conscious to being totally unconscious in about two days. What you need to do is constantly call yourself back to consciousness.

Now the way I do it is I take on assignments that I'm unqualified for. I do that all the time. I have projects running all the time for which I'm not qualified. When I designed my first show for the Smithsonian, I had never designed an exhibit of any kind including for homeroom. I had never designed an exhibit. I went to them and I talked with them and said "I'm really interested in this, etc." And they said, "Would you like to design an exhibit for us?" They did not say, "Are you qualified? Have you ever done this? Are you a jerk?" They didn't say that. They said, "Would you like to design an exhibit?" And I said, "Yes." And they said, "Great!" And that was it.

Then I went to the source. Let me tell you how you gain confidence--you go to the source. I went to the Los Angeles telephone directory and looked under exhibits, exhibit design, exhibit design materials. And they listed two places, a place called Flax and a place called Daniels. Flax is out in Westwood. Have any of you been there? I went in there, it was pretty, all yellow, pampus grass, girls in little cut-off jeans and Dr. Scholl sandals, and they were signing checks with surf pictures on the checks. It was obviously very, very stylish.

I went down to Daniels, downtown on 32nd Street. It looked like going into a backroom of a warehouse. There were stacks and stacks of sheets, and 50 drafting tables over here in a pile. People would come in and drop off a purchase order and go out on the street and smoke while they were waiting. Then people would load up. And I thought, "Ahah, this is for pay and that's for play." I mean this is where the pros do it.

So I walked up to a guy at random and said to him, "Do you know anything about designing exhibits?" And he said, "Yeah." I said, "Does anyone know more than you?" And he said, "This guy probably knows more about layout." I said, "Great, when we get to layout would you ask him? See I don't want you telling me anything that is baloney--I just want the best you got." He said,

"Fine." I said, "I got a show here and a budget of $17,000; I'm going to buy everything from you--every eraser, every piece of paper, everything from you." He said, "This is great." Then I picked up the first thing I could find and I said, "What is this?" And he looked at me and said, "It's a burnisher." "Why?" I said, "What do you do with it? I don't know what it is." He said, "You don't know what a burnisher is and you're designing a show?" I said, "That's right." He looked at me and said, "You have got some guts. Well, pal, you need help." In six hours on a Saturday, he gave me a complete course on how to design an exhibit--what you buy and what you don't buy and why the expensive one is a waste of money. He was totally responsible and I had that stuff delivered on Monday, and I still use that same drafting room and all that equipment today. He gave me the whole course in one day, but it was because I had a contract with him and he was the source.

How much would I have learned by going to a community college taking a course two nights a week per semester? Well maybe a lot, or maybe not a lot; but what's important is the contract between you and the instructor--not what it says in the curriculum. The contract is what matters, so you have to go to the source in my opinion.

Now I'm going to stop for a second and ask if you have any questions at this point about what I'm talking about--about conscicusness and the technological revolution. You have any questions at all?

We are entering an information age. What does that mean? Give me two lines on what that means to you.

Why do you believe it? You know that what you believe is what exists. Reality is a figment of your imagination. There's nothing out there that you don't believe. For my mom and dad there's no third wave. They are living in the first wave. My mom and dad live in Independence, Missouri. He's a cabinet-maker and a gardener, and my mother gets up at 4:00 a.m. every morning and prays

and plays hymns on the piano and frequently calls me as soon as she gets up. "Richard, I had a good thought for you." And I explain to her, "Mom, I live in LA, you live in Independence, you know, and the world has times zones, kind of like a big orange. It's four o'clock there and it's two o'clock here." And she says, "Just hush up now and listen to this." She reads me something from the newspaper or the Bible or something. They work all morning and go to bed about noon.

It's true, and they are happier than any of us because they're not trying to fix it. See, you're trying to fix it. Let's get some innovation in here. They're not trying to do that. It's already fixed; this is it! He just works and prays and tends his garden and goes to bed early. He will not be better off with a computer, if he puts all his nails on this Visi Calc. "How much walnut have I got? Let's go to cell D-9. I have eight pieces of walnut." This will not leverage him; that will not enrich their lives; that will not make one ounce of difference to them. So the world that they live in is complete and it does not include technology. They've never been on a plane, and never will be, so they're not interested in cellular radio. See what I'm saying--there is no third wave for them. Is there for you?

What signs are there for you that the information age is here? Let me hear a couple. "Industry tells you to get with it." I guess that there is some reality in that. What do they mean when they tell you to get with it? Get with what? What do they want you to do? Okay--learn about computers. Okay--now here is a good one. "Society is far ahead of education." It is one of the first times for a long time that that's been true. You know, don't you, that the function of education has changed about every hundred years, and now it's changing about every 50 years. What was the purpose of education in America in the beginning? Yes, teach people to read and study the Bible. Then

it changed with the development of higher education--it was to teach people to teach people who studied the Bible--to teach masters. Then lay education appeared and it was to teach Governors to control the uppity ministers who were getting the people all stirred up about stuff that they didn't think was Biblical.

Then the Industrial Age came and people had to be able to read. You know, it said on the stamping press, "Do not put your feet under ....," so people had to read to run the machines. Then the idea appeared of egalitarian, universal education--that it was just a good idea for everyone to read and write. It was just a good idea.

What is the purpose of education in the next ten years? What should it be? So that everyone can read and write? Could be. To survive. Any others? Compete. Okay--if you're talking about competition, you have to find out what the race is--who is running and what are we trying to do here.

My experience is that the information society is here. In 1776 only one out of a thousand Americans handled information of any kind. Only one out of a thousand people ever wrote anything down--words or numbers. What did the other 999 do? Well, they communicated verbally but they weren't paid for smart talk. They built things. They were like my dad. They farmed, they handled cattle, they made shoes, they manufactured from manufacto--I make by hand. They manufactured things. In 1900, one out of ten Americans handled information. Nine out of ten ran the machines and one out of ten wore an eye shade and wrote down boxes as they went out. Now one out of two Americans handles only information professionally; two out of three urban dwellers handle only information; and three out of four Southern Californians do nothing but come to meetings like this, take notes, type them up and file them. Some people actually tape it, listen to the tape, transcribe the tape, pack it up and file

it. You know--we better have a record of this. So a lot of people just handle information. This (computer) is as much a tool for the effective handling of information as my dad's shapers and routers are effective tools for handling walnutry. You need to see this (computer) as a tool.

A lot of people think we're learning to do computers so we can all do computers. If I thought all I was doing with computers was running computers, I got a lot of hobbies that are more interesting than that. But this leverages me. How do I have the time free to come here? See, I'm a teacher at USC; I run the comprehensive exam program; I have two businesses on the outside; I'm writing a book; I love my wife; I spend a lot of time with her and my kids. So how come I have the time to do this? I'm leveraging myself. After this meeting, I have another speech, right over here at the South Coast Plaza Hotel tonight to the Orange County Education Association on a different kind of topic, but related technologies. In the next four or five hours, I'll get a chapter drafted on this computer. There's no arrogance in that. I couldn't possibly do that if that was a typewriter and sheets of paper and scissors and scotch tape and all that garbage. So you are freed up to spend your time with your family or to work on the arts or to do whatever it is. This is a powerful leveraging tool.

You will never find me sitting around playing space invaders. A lot of people have the idea that technologies are seductive and that you will become the downside of the Frankenstein image--that you will somehow be seduced into becoming technological. That's where arises the false dichotomy between the humanities and technology--that somehow we will all just ahhhh--like a great vaccum cleaner get sucked into technology and find ourselves eating junk food and getting white and standing in the basement. That's not true, that's not true! What it will do is permit you to be whatever you are right now, but more

so. If you are gregarious, if you like to be with people, you will be with people a lot more. If you like to do finances, you will find you will do a lot more finance.

So the danger is, you want to become what you want to become before you do this. See what I'm saying? Become what you want to become, like if the camera crew came in here to film this for television, all of you would take ten seconds to become what you want to be in the record--you would become what you want to become before it happened. Do that before you use the technology.

Now let me give a couple of the key indicators that I see of the information age. I think we're moving to information instead of production--instead of producing goods, we're producing information. I think there is going to be a profound intellectual retooling of the industrial areas, and I don't know the answer to how that retooling is going to take place. But the candid fact is that because of trade agreements a lot of things that used to be produced here aren't produced here anymore. It would be nice to change that, but I don't see how to change that. So there is going to have to be a retooling of the mental set.

The big problem with automotive workers who are being displaced is not that they can't learn a new technology--it is that they're automotive workers. They say, "I'm an automotive worker; my dad was an automotive worker; my grandfather was an automotive worker; I was born here; I was raised here; by God, I'm an automotive worker!" Then the plant closed.

The problem is not, can that person be retooled? It is, will that person surrender his mind set to embrace a new mind set, and do you have one to offer him that is more attractive, more stimulating, more rewarding? So there is that kind of change.

Another change is, I think there is going to be retraining inside jobs. I don't know any job in America that is going to stay the same for the next five years. I think there is going to be a profound impact of technologies on all kinds of jobs. The community college is the ideal place for it. A lot of people who currently are skilled in their jobs need to be reskilled.

That's why I just formed a company called the Education Company. It's essentially a community college for pay, for profit. You know what I'm talking about? I can't get these things done at USC. I say, "Let's do this Executive Development Program." They say, "Good, we'll look into that." Snore. Two years later, I get a report that they are meeting.

I found that you can form a company, make it successful, find a president, and turn it over to somebody and have the thing stay up like the plate and the stick act, and you go on and do something else. That's why I'm working with what's called the Education Company. So I think that's going to appear.

I think there are going to be completely new jobs. I think that jobs are going to appear that have never existed before. I'll give you an example of that. Remember cars. Remember when cars first appeared? Well, most of you were not here, but you kind of have in your mind the notion that there was a time when there weren't cars.

By the way, you need to know that that's why kids think you're crazy when you talk about computer phobia. You say, "These things make me nervous." Kids under the age of eight who were born into a world that was full of microcomputers--it was also full of drinking glasses, chairs, lights in the ceiling--and they're learning about all of it equally. To them there's no difference between that and drinking glasses. Kind of like you saying, "Drinking glasses, I don't trust them. I kind of stay away from drinking glasses." Kids look at you like, "What is going on with this guy?" Except we were born into a age that didn't have these things, and so for us we have to retool our minds.

Now, when cars first appeared, what did they call them? Horseless carriages. Does that make sense to you? It makes sense to me. Call it what it isn't. Good way to categorize things. What is this thing? This a check. Let's not call it that; let's call it the cashless paper. The only reason that made sense is because you had a paradigm that was so prevalent that everybody knew that carriages had horses. That's one of the reasons that you're in the information age and it's so hard for you to describe it. It's all around you so how do you describe what's all around you?

Whoever discovered water wasn't a fish. You say, "How do you like the water?" The fish says, "Hmmm?" It's all around them. One of the problems is that Paul Vallery says, "The problem with our times is that the future is not what is used to be." The future is not what it used to be. We used to know what the future was going to be, didn't we? Can't you remember ten years ago when you knew what it was going to be like in ten years? I mean it would be like this, but a little more so. We are now looking at an era where the future may be different--I mean totally different. So when cars appeared they said it is like a carriage, but it has no horse so this is called a horseless carriage.

Then a magazine was published by Ford, called the Horseless Age. Now, was it really a horseless age? No, but it the biggest change that they could talk about. So we talk about the information age. Is it really? Well, sort of. That's sort of typical of what's going on. So people began talking about horsepower--how many power horses does this engine represent. You can now fly in a plane that has engines with 200,000 horsepower. When is enough enough? It's been 80 years ago. Can you imagine a team of 200,000 horses? How much power would that really generate? If you ever worked on a farm, and I have, brace up here 200,000 horses and say, "Go guys!" It would not generate one

erg of energy. We're still clinging onto horsepower, because we know about that old paradigm. Furthermore we start building a whole industry around this thing that's like horses but isn't horses. So--the paradigm shift.

Now we have stuff called electronic mail. It's like mail, but it's electronic. What's the problem in that? What is the problem in sending mail electronically? What do you put at the top of a letter? Usually you say: "Dr. Richard Byrne, Frankenstein Enterprises. Dear Richard, Thank you very much for the ...." In electronic mail when you send it to TCS 029, that's me. So if you type in TCS 029, that's me. Anything else is redundant and superfluous, and expensive. So if you say TCS 029, and then you do the old work in the new medium: "Dear Richard, It was really wonderful seeing you again ...," and you are composing at $22 per hour, you will find that a letter sent electronically will cost twice as much as a letter.

So if you're going to do the old work, use the old technology. Use paper, and a typewriter and mail and stamps. I don't know if you saw this thing MCI did. At a test at a convention last week, they gave everybody these yellow slips of paper and they said, "Send them to your office and we'll show you delivery." In like four hours or twelve hours they sent them. It took six days because the stuff had to get there and somebody had to sign for it and of course everyone was at the convention. There was nobody to sign for it, so they sent it to the post office. It was Friday and they didn't deliver it until Tuesday, so it took six days for this four-hour mail to be delivered because they were doing the old work in the new technology.

What you've got to design is the new work. You don't want to do old work in the new technology. You need a new way of working. What we need are new modes of education, not just ways of delivering traditional education through new technologies. So the transformation is not the technology, it's what should we be doing really?

What should be going on in classes? I'll just give you a tip. I have renegotiated the contract between myself and my students. We have a completely different contract than anything I've ever used before. This is a class of 225 students at USC. The agreement I have with my students is, if you teach me individually a lot of things that I did not know when the course began, you get an A. If you teach me some things that I did not know, you get a B. If all you can do is repeat to me all the stuff that I already knew, you get 100 on all the tests, that's a C. If you can't tell me everything that I already knew, like you get 50 on the test, that is a D. And if I suspect for one part of one class period that you know things that you're not telling me, you get an F. Now in actual fact, if you get all the points right on the papers, you do get an A. I tell the students that and obviously you have to do that. However, I want them to understand that what we're really dealing with is information exchange. If I'm up there lecturing and I say something that is wrong and they know it's wrong, I want it corrected right then, that instant. I don't want them sitting there getting arrogant saying this guy is a jerk and let bad data continue in the room.

Some of you have gone to summer school and studied BASIC and you come back in the Fall to teach BASIC and the students learned that by lunch. I mean the first day they caught up with your summer course. This is true of grade school kids, third grade. They know everything you learned all summer by lunch the first day.

And then I see students and faculty going to war with one another. Students are trying to get access to the machines, and the faculty are saying, "My God, what am I going to do next Tuesday? This has got to last another week." So they say, "We need to do flow charts of all of our programming."

So they start drawing this time-consuming garbage work whereas the kids want to learn intuitively, so you're putting roadblocks in front of the students. You've got to turn it around. There's no way for me to stay ahead of my students. Can't be done. I cannot stay ahead of my students. There are a lot of things I know that they don't know yet, but I want them on a scavenger hunt in the world of the intellect. I want them bringing me prizes.

I used to have two cats. I would drive home at night and both would be lying on the doormat in front of me. I would walk over and they would meow, and I would pet them and they would stand up and they would have their paws on a lizard. They would catch lizards--never killed them--never ate them--never chewed their tails off--they would just trap them. And they wanted me to see that they could do that. I would pet them and I would say, "Let it go." And they would take their paws off. The lizard would be praying to the lizard god. I would go into the house and I would come out two hours later, and the lizard would still be there, uninjured. They wanted me to be pleased that they could bring me what I wanted.

You have to have that relationship with your students. The students have to know that the way they please you is that they go learn things and they come share them with you and that their teaching you is what pleases you. Contracts are wired up all wrong. The idea that faculty are supposed to know more than the students is not possible in the information age. You have finite resources. There are only so many hours in a day, you can never know as much as the students. So I think a key change is there has to be change in the social contract between teachers and students.

Last couple of quickies in the third wave. I think there is a massive deschooling going on. Deschooling. I think a lot of things are happening outside of schools that used to happen inside schools. Sears and Roebuck is

going to be offering courses soon. You can get computer software now that will teach you accounting, and also sets up your spreadsheets and has a section in the end that advises you on incorporation. So you learn how to account, set your spreadsheets up, and there is a kind of incorporate yourself data targeted by state so that the quick corporation data is correct. And it costs like $65.00.

Will that have any impact on the accounting courses in community colleges? Will all these autotutorial programs like Edu Calc--which not only teaches you how to use Visi Calc or Super Calc, but also gives you 100 business applications that use it--will that have any impact on business programs in continuing education or at community colleges? Well, I think so. I think it ought to be good news! It's a challenge and a new opportunity. You see, a lot of people look at problems and they think that's bad news. Problems are the good part. You ought to embrace the problems because they are the stimuli that get you unstuck and get you moved on.

How many of you have ever played tennis? Good. That's a very perverse thing to do. I understand you played yesterday. Makes sense to me. It's a strange thing to do. Look at the problems that you are choosing voluntarily, taking upon yourself. First of all, can you get a court? Can you get a partner? Do you have clothes and a racket and all that? Let's just take a look at the serve. First of all, can you hit the ball? Can you stay off the line? Can you hit it hard enough that it gets over the net, but soft enough that it's short of the long line and left enough that it's clear of the right line and right enough that it clears the left line? And hard enough that you don't look stupid? That's eight specific problems in the first shot. Then he knocks a passing shot into the showers and you say, "Ho, ho, ho; first shot; alright!" And then you make it harder on him, and he makes it harder on you, and both

of you are near coronary after two hours. You help each other to the cars and you say, "That was great, can you play tomorrow?"

Stop and think about that for a second. Because it's in the context of a game and because it is freely chosen, you think the harder the problem is the more recreating it is. The tougher the problem the greater the recreation. But it's in the context of a game. See I'd like to see negotiations between teachers and superintendents and unions, and so forth, where all of you come out into a room sweating--you got sweatbands, wristbands--and say, "That was great; you killed us in the second set. Okay, why don't we do this again tomorrow." You all pick your placards and go off on strike. That would be a different kind of relationship. See what I'm saying? The problems are the stimuli to create solutions. Any questions at this point?

Let me tell you about Osborn and why that's so interesting and why some of you might really want to wake up and notice what's going on. I did a presentation, a regional presentation, for this group in Emeryville. At that time I was in a contractual agreement with Adam Osborn. I was producing, writing, directing and performing in a 30-minute demonstration tape, to demonstrate to sales representatives all over the world the new executive computer. And I had the prototype, the number one, insured for one million dollars with me at that meeting. I had it on the table, and so forth. We had just hired 400 more people. We had just bought seven plants in Hayward. This was in February, and they are now in "Chapter 11."

They had a growth curve that was going just like that. I don't know if any of you know catatrosphe theory, but things were changing so much that they stopped noticing things were changing. They got so accustomed to things changing that they didn't notice that things were <u>really</u> changing. There were a couple of things that should have rung a bell. But everything was changing

so they just said, "Ehhh." Like the guy who fell off the 50th floor and as he passed the 28th in about February he said, "Everything is great so far."

So you need to know that in this microbusiness, they made one very smart decision and that is they built them all of off-the-shelf parts. So if something is wrong with the chips, you can go buy the chips at Radio Shack or anyplace else. However, they made some incredibly bad management decisions. If they were running a sewing machine factory, they would have "Chaptered 11." It had nothing to do with the technology.

The first question I asked you I spent an hour and fifteen minutes on. The second question and the last three will be short.

Will the change, if there is any, have any effect on you? Will it have any effect on you? How many think that it will have some effect on you? One key issue you need to look at, and I've already referred to it, is this change cyclical? Is it an Apple in every garage in two years? Is it a fad? Is it something that is here and soon going to be gone? Or is it structural? Is it like actual transformation? Is it a structural change like cars? Like telephones? Like pregnancy?

You know there are systems when you do something repeatedly and nothing happens and then you do something and it does happen. Then after it happens, everything changes. Politics change; economics change; social relationships change; there is a transforming event.

I am of the opinion that the transformation already occurred--in 1959 with the development of the integrated circuit. I believe that the notion of the integrated circuit and the fact that you can now have something like this little caculator, which only cost $79 six months ago and now is $49 and will soon be $29 at K-Mart--this technology would have cost $20,000 four years ago and now you can buy it for $49. So the transformation, in my opinion, has already

occurred. Now if in fact it is a transformation, what will change is your mental state, your world view--not the work you do, but your view of the work you do. You need to be deciding for yourself, what do you want the view of the work you do to be?

I'll explain the premise of the book I am now writing called Breakthrough. It's about quantum leaps forward in human experience. When a true breakthrough occurs, like the Wright Brothers at Kittyhawk, the moment it occurs, the world view of everyone regarding that barrier changes forever. It's not just that they improved; in fact, breakthrough is the antithesis of improvement. Improvement is inch by inch we get a little bit faster over time.

Now Breakthrough is about spontaneous wildfire. You have a breakthrough, like the four-minute mile. I don't know if you remember that, but at the time of the four-minute mile people believed that if you ran any faster than four minutes and one second, your heart would explode and blood would gush out of your mouth and nose and you would fall dead. That was what they believed. So when Banister ran the four-minute mile, he was taking a chance. He did not know they were wrong. He was wishing and he wanted to do it, but he also knew that a genuine possibility would be that this would be the last thing he would ever do. That was a breakthrough. People suddenly said, "Hey, he did it in less than four minutes." Everybody said, "I didn't know you could do that!" In two years there was a race where seven people, all seven runners, ran it in less than four minutes. So he swept the human race through the barrier with him. That's a breakthrough!

I was having a fight with him last night. He heard a little bit about the premise of the book and quite intuitively, quite accurately said that Bob Beamon's long jump wasn't a breakthrough. I said, "That's right, it really wasn't--it was a phenomenon!" But it did not sweep the human race through with it. I don't know if you know it, but in Mexico City he jumped over two feet

longer than anybody had ever jumped. God just gave him the gift of flight for a moment. Now we are creeping up to it; but in a true breakthrough, once it occurs, everybody goes through with it.

I don't know if you know, but the Wright Brothers, the first time they ever flew, got ten feet off the ground, which is about from here to the floor. They went 112 feet. Within eight months President Teddy Roosevelt sent them a letter offering specs and said he would fund a factory for them with federal money if they could fly two people at forty miles an hour 180 miles. In eight months we went from ten feet to two people, forty miles per hour, 180 miles. You see, our mind set just goes from "human beings can't fly" to "let's set up an airline," and it happens almost instantaneously.

Now my question to you is what breakthroughs would you like to see occur before the year 2000? What breakthroughs would you like to see in community college education? Not how can we get a little better and which computer should I get and so forth. What would you like to see happen that would be transformed, a new way of doing things? Can you think of anything at all that would be like that--that would just be a fabulous resolution about what's going on in your life? Not improvement; not fixing it up; but transforming it? Anybody? Okay! Good! World-wide instantaneous communication. Immediately some people would come up with, "That would be bad because ...." One possibility would be that that would help us in communication and education. Another? A new discovery in either learning theory, or maybe we can learn something about the electromagnetism of the brain.

My own children, Megan and Heather, are 18 years old, and they happen to be profoundly mentally retarded or developmentally disabled or whatever your favorite phrase is these days. And they can't speak. They communicate with sign language and so forth. I now know that from brain scans on my daughter,

Heather, particularly, that she has this recurrent, flickering petit mal seizure, a little electric current that runs around in her brain. You know the instant it starts to happen. We are now working in biocybernetics; we're working in the intimate relationship between mind and machine.

Many of you have prostheses in your bodies. You have a hip socket or you have a plate or you have a pacemaker or you have whatever you have. There could be a resistor that could be given to kids--maybe it could be given orally--maybe it's not an implanted chip--maybe there's an oral resistor that would give her one month of immunity to that particular kind of electric circuitry. I think that's quite reasonable.

We're now working on computers that are biological--computers that have tiny plates of glass with protein structures in them, and the protein structures switch the electrical current except they are so much smaller than chips that they may increase the speed of computers one million times. Now some people are talking about the power of the 1000th time improvement of speed with optical computing. I don't know if you know that we are now switching lasers through optical transistors and that goes about 1000 times faster than mainframes. But when we go to biological computing, there will be absolutely phenomenal increases in speed, which means you can have instantaneous communication, you can have voice entry, voice actuation. My kids may be able to think things and have it communicate with us over the phone.

You know you ought to read the papers. I'm not talking airy fairy. I haven't said one thing today about something that's not on the shelf, that I haven't pushed the button and run. So there are real breakthrough possibilities in learning theory and the physiology of learning. Where else might we have a real breakthrough?

One of the real reasons I'm interested is that I want to have a section in the close of my book that is the thinking of some of the best minds in various fields of the agenda for breakthrough. I'm absolutely clear that breakthrough is called up out of the void by a conscious action of human beings. It's not chance. It's always called up. So I would like some of you maybe to communicate with me or send me letters or let's talk on the source or by phone about what you think breakthroughs in education should be. Let me hear about two more.

Global understanding! Insight! Good. Good. Understanding of the planet earth, right? I would say understanding of both the biosphere and the ecosphere. I would like to add both. I don't know if you've read The Life of the Cell, but the opening passage is one of the most poetic things I've ever read in my life. He talks about when you look at the earth from the moon in those NASA photographs, it looks like it's one living cell--it's wet, and moist and blue and we really have to see ourselves as one living organism, not a lot of organisms in competition with one another.

A library on a computer. They now have developed quartz storage systems that store holographically up to 50,000 five-hundred page books in a quarter-inch cube. So a thing about one-third the size of a sugar cube can hold 50,000 five-hundred page books. Which raises the interesting question, "Which books should they be?" And immediately the community breaks into two groups. "Well, don't have "Catcher In The Rye." So the problem is not digital compression, it's getting an agreement on the catalog.

We really need to have videoconferencing/audioconferencing facilities because I would very much like to interact with this group particularly and this group alternately. And yet physically we can assemble, but it's not the

same to do monographs and distribute them and get it later, etc. We really need to be able to have an audioconference, where we link from twelve urban areas--Kansas City, Los Angeles and San Francisco--and we have a dialogue about my book or your book or your curriculum or whatever on an ongoing basis. That kind of relationship is very important.

One more? Neutralize the neutron bomb. You know I honestly think that's really what we're up to. People don't acknowledge it, but I think that we're all at war with holocaust. I think that isn't what education used to be about, but I think it is now. I think it's really about affirming and reaffirming the human spirit in the face of potential destruction. A lot of people have gone totally unconscious on the bomb. "They haven't dropped it yet. I don't think they're going to drop it."

Just take a look at military expenditure in this country. I do not believe that we should not have defense or anything else--I'm not that strange--but take a look at our priorities, because where we spend our money in fact represents our priorities as a people. If we really thought that education was the number one thing that ought to be going on, that would be the number one thing that ought to be going on. So there needs to be a real cultural transformation in that area. I'm almost through and out of time, so let me ask the last two questions.

The third question is, <u>will you have any effect on the changes</u>? <u>Will you as a League or as individuals or as educators have any effect upon this information age</u>? How many of you think you will? Good. Well, you either will or you won't. You will or you won't. If you know what is the effect you want to have and you're not having that, then you need to change. And if you're not having it, you need to change. And if you're not having it, you need to change!

I had a cat named Abigail. Abigail loved me and she would be petted by me once a day. She would be petted once a day. It had nothing to do with my interests. I was not interested in the beginning; I hated the cat. I would lock her out of my den. "Meow, meow, meow." I would lock her out of the house. She would climb the oak trees, find out what room I was in, leap to the screen wire and hang wherever I was. Then I had a choice. I could either shoot the cat, which I did not want to do, or open the screen wire and let the cat in. Of course I would get worried, "Oh, will she be safe?" You know cats are so cute.

So I would bring her in and I would pet her and pet her, and if I was through but she wasn't, I would take my hand away and like you ought to do she would reach up and hook into my skin and pull my hand right back down to her head because she wasn't done yet. So I would pet her until she was done, which needs to happen with you. I would pet her until she was through; then when she was through she would go into the next room and have a cigarette.

Her purpose was clear. Her purpose was fulfilled once a day, and after a short training period she would walk into the room and I would see her and I would say, "It's time to pet Abigail." And I would stop whatever I was doing and would pet her until she was through, and then she would go away. It took her about three weeks to train me completely; but her purpose was clear and when it wasn't working she never gave up until it worked.

So you need to know when your purpose is being fulfilled. When are we making progress? If we're not making progress then do something else. If that doesn't work, do something else. You are responsible for the success of your purpose. I think you have to leverage your own skills. You have to leverage leadership. You have to find the thing you personnally are best at and you

have to get better at it. Anything else is a waste of time and energy and is counterproductive.

High school track coachings. If you have a high school track coach, go talk to that person. That's the one person in ten who knows how to do this. A high school track coach looks at the freshman gym class and says, "Oh, my God, these are my people. Well, that kid could probably run a mile. Come here kid. Can you run a mile? Okay, you're my miler." That kid might be able to jump over a bar. What they do is find the thing the person is inherently best at and then they fine tune that. They help him get better and better and better at it, and then they help him let go of the things that make him less good at it.

The key to transforming yourself regarding a technology is finding out what you're clinging onto and letting go of it. Let me say it over again, the key to learning a new technology is to find what you are clinging onto in the past and to let go of it. It's not learning to climb a mountain, it's learning to let go of an anchor. If you are nervous about this technology, there is some skill you currently have that you feel is jeopardized by the technology, that somehow you will lose the ability to be good face to face or something.

Do you know how the Balanese trap monkeys? Watch my lips on this. They take a vase and tie it to a tree and they throw a gord in it, and that's it. That's how they trap monkeys. A monkey comes by, sticks his hand in the vase, grabs the gord, can't get out with the gord in it, but he's already got the gord. I mean he's got a good thing here called "I've got the gord." Then the natives walk up and pick him and he says, "Well you got me, but I got your gord."

So the barrier in educators is, they're holding onto something in the past that they were good at that they fear they will lose. It's like a trapeze act.

You have to let go of one bar to get to the other one. Then you hang onto this thing called the "void." I guarantee you when you let go you will be uncertain. You cannot look before you leap; you cannot figure out if the technology will work before you decide to get it. You can't do that, because then you're not really breaking through. You're not really letting go.

I'm going to tell a story, my favorite story, and I tell it all the time. How many of you saw the movie Butch Cassidy and the Sundance Kid? One of the most telling lines for educational reform and innovation is in that movie. Remember they've been chased for three months by Lord Baltimore, over rocks and deserts and they're finally chased to the top of the mountain? Remember the computers near the top of the mountain? "Oh, my God, there is no escape here." These guys have got rifles aimed right at them and Butch Cassidy suddenly has a breakthrough. He says, "I know what we'll do! We'll jump!" It's 200 feet to a river. Remember that there's rapids down there and a waterfall? "We'll jump!" Sundance looks. Butch says, "They'll never follow us; they won't jump." Sundance says, "I'm not going to jump; I can't swim." Butch says, "What did you say?" Sundance says, "I can't swim!" Butch says, "Swim, hell, the jump will kill you." Sundance looks down and says, "That's right." He doesn't mind and they jump.

Sundance was not afraid of dying, he was just afraid of drowning. He didn't want to drown. When they promised him he would hit his head on a rock on the way down and never get to the water, he said, "Oh, I can live with that." So a lot of people fear something that's not the computer. It's fear of loss of something that they think the computer will replace. You're wrong. Find out what it is and let go of it.

I had a world view that I was a humanist, that I was a musician, and a photographer, and a painter, and a poet. I believed that people who can use

computers were social scientists, art scientists, physicists, mathematicians. I believed that we were qualitatively different. I believed that their skills and their training and their abilities qualified them to use this and my skills and my training and my abilities didn't. I further believed that the humanities are more valuable than the sciences. That was what I believed. It seemed to me that to crossover here and start to use this meant that I was going to surrender up part of the core of my being, called my sensitivity, my artistry, my interests in those kinds of things and that somehow it would be like dumping garbage in an ice cream sundae or something. That it would somehow sully who and what I was and that I would find myself at the bottom of a huge stack, incompetent and competing with people who were competent. And I finally said, "I don't care; you got to know it." And I sat down and when it began to support me I found that was all totally fallacious. I am more effective as a humanist that I ever was. But it was a real test of temperament, a real test of who I am. And it will be true for each of you.

Now, my last question and then I will wrap up. What should you do right now? I'm going to give you some one liners so you write them down. Be conscious often. At least occasionally. Be consciously conscious. Like five minutes until the hour, be conscious for five minutes. Now I will tell you in preparing for speeches of this kind, I say the Lord's Prayer. I don't want to get religious here, but I say it over and over until I can actually be conscious of each word. It's very difficult to do it. It's very difficult to stay conscious for 45 seconds.

So five minutes until the hour take the morning news, read the front page of the Times, or whatever newspaper you read, and stay as conscious as you can about you and your students and your school district and the information age. Read the front page and look for things, and you you will see things that will

leap out like neon signs--ideas, stimulations, topics for lectures, motivation for in-house training. So be conscious, at least occasionally.

Second tip--be willing to start ignorant. How many of you are ignorant about this? It will be hard for you because you are so educated. Education is the enemy of ignorance. It's not okay for the President of IT&T to be in a press conference at the Waldorf and have the press say, "Well, what happened to your division in the third quarter--you lost a lot of money?" And the President of IT&T says, "I don't know. We lost a lot of money." That's not an okay answer. He's supposed to look like he knows. So when you're an educator, for God's sake, you go to Computerland and say, "How many K does this machine have? How many does this one have? Oh, so this has many more K." But that will get in the way of you learning.

I had an executive come to my training once and on the Apple there is a space bar that says 48K and he says, "I see you're using the 48K Apple." I thought this guy is going to keep learning from happening in this room all day, because he's going to look like he knows stuff that he doesn't know and he's going to make all the other trainees feel like they're behind. So I thought he needs to get ignorant right now. So I said, "No sir, we're not using the 48K Apple." He said, "You're not?" I said, "No, I just got an incredible deal on 48K stickers." I just looked at him. I didn't sneer. I wasn't making fun of him. And he said, "Aha! Okay." He didn't know what to do about that so he sat down and took the course. That's called tough love. So be ignorant. Uncertainty is a creative opportunity. When you're uncertain, a lot of creative solutions can come out of it. So be at least as ignorant as you are.

Third, is ask kids and listen. Ask young kids, not just college students. Ask your grandchildren. Say, "I'm in charge of the Johnson County Community College, honey," (you're talking to your seven year old granddaughter) "and we're going to ... What would you do?" And she will immediately start giving

you suggestions about having a party, or do this and send everyone a Christmas card, or whatever it is. Don't be arrogant because kids understand technology intuitively, and furthermore they haven't yet learned the world doesn't work. So everything they give you will be positive. It will all be assertive, supportive and positive.

I'll just give you two last tips. Before you train an executive, train a whale. How many of you have ever seen the Shamu Show, or the Marineworld or Seaworld? They are on both coasts. They train killer whales to leap up in the air on a certain beat of the music and empty the tank on people from Dubuque. How do they get the whale to do that? Because if they can get a whale to do that, couldn't you get the superintendent to go along? Couldn't the whale trainer get the superintendent to go along? The first thing they do is find a natural behavior at which the animal is good--swimming and leaping.

So you got to find a natural behavior at which the administrator or the student is good. That is the first problem. Second thing is they reward that behavior every time it is performed. They put a rope on the bottom of the tank, the whale swims over it and they feed him. Swims over it, they feed him; swims over it, they feed it. They raise the rope to the middle of the tank. Swims over it, they feed him; swims under it, they don't feed him. Then the whale says, "This guy is not trained good." So he goes over it more. Then they raise it to the top of the tank so that to get over the rope, he's got to leave the tank. The whale will pause for about an hour, watching the trainer, because he knows they're going through what's called a paradigm shift. Whales say, "Uh oh, paradigm shift coming up here. I'm going to go over the rope, but I'm also going to leave the tank." Finally, he says, "Well, I have to do it sometime." So he does it. And when he finishes he says, "Alright!"

Now the way executives should learn computers is to take it home and see if you can get a light on. See if you can get the disk drive light on. If you can, have a drink. Then, can you get the light off? Go have a second drink; call it a night. Let me tell you why I tell you this tip. Everybody I know who works alone works till the level of incompetence and they stop at night losing. That is, they learn how to do Visi Calc and they learn how to do this and then they get to replicate, which is complicated. About 2 a.m. they get stopped in replicate. "Well, I'll pick this back up tomorrow." And they go to bed failing with their subconscious minds saying, "We could have solved it if we had more discipline." And they lie there all night thinking.

So what you have to do is anytime you find yourself stopped, back up to something that you can in fact do and do that. Quit winning. I'm telling you that learning theory demands that you always quit winning.

My last tip is, come from aliveness. As you deal with these problems, they tend to make you a little bit dead. Like which computer should we get? (Yawn.) Then you get home. Have you ever lost a file on a computer? Ever discourage you? I mean you write an 85 page memo and then you press store and wrong disk drive and your program is eaten. Or, somebody comes in and says, "Oh, this is so neat," and they step on the cord and all goes blank. At home it's okay for you to swear, but not at the school. When you're working there and you lose an 80 page file, you have to say, "Ha, lost an 80 page file; now I can learn about recovery."

You got to put on aliveness because people read from you. Have you noticed that I've been alive up here for the past hour and a half. Did you notice that that's not dependent upon your response? Great response. When there is no response, I say "Whoa; do something else; shift gears."

But I cannot become a mirror image of you; you must become a mirror image of me. I've seen many educators who come in and say, "I think we should develop a new computer literary program and here is what I think should be in it." People say, "Is this a good idea you got out of Newport? Did you just get back from a convention or something?" And you will tend to mediate down to some compromising level between true energy and energy of the group. You cannot get me to compromise on my energy level. I do what is appropriate. I don't yell and scream at the coffee shop. But you must come from aliveness like you come from your hometown. I come from Independence, Missouri, and none of us can change it. God knows what we need in education is not more computers, but more aliveness.

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